

Practical approach to the emergency and small animal practice and importance of nutrition intensive care.

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From the phone call to the ICU.

When the phone rings.

It is important to train the person who answers the phone. Often, the owner will be highly stressed and can be irrational. It is paramount to remain calm and ask the right questions.

First about the animal: knowing the breed will give a good indication about the weight and allow the staff of the clinic to get ready. There is a huge difference between a run over cat and a great Dane with a gastric torsion.

When did the first symptoms appear? We're all familiar with the Saturday night "carpet emergency" (the dog, which has been vomiting for three days, whose owner can't suddenly wait to be seen). No need to rush for those, but they still should be seen.

It is paramount to find out the following: is the animal conscious? Breathing?. How? Bleeding? Any wound? Fracture? Swelling? Vomiting? Diarrhoea?

Advice will be given to prevent bites or further accidents, especially in case of traffic accidents.

Details of the owner, whether he is a client or not, must also be noted as well as a contact phone number (mobile).

If there is a history or suspicion of poisoning, ask the owner to bring the box of the toxic substance. Not only will you know exactly what it is but you might also be able to evaluate how much the dog or the cat has taken.

The following conditions warrant immediate consultation: sever cough, nervous symptoms (coma, seizures), unproductive retching, abdominal distension, tachycardia/bradycardia, leading, poisoning, sudden collapse or apathy, pale mucosae, impossibility to urinate.

You can give the following advice :

- Muzzle dogs and wrap cats (pain → aggressive reaction)
- Vertebral trauma → hard board (not stretcher or blanket)



- Broken limb → splint (rolled magazine, plastic bottle...)
- Haemorrhage → pressure pad (not cotton wool) but no tourniquet (damage to vessels and nerves)
- Burns → cold moist pad
- Trauma → cold pad (or frozen pea bag)

In case of further litigation (those things happen), it is important to warn the owner about the fees of an emergency consultation, especially at night, and also to keep notes about the time of the call and the symptoms described by the person calling. Don't forget to give the exact address of the practice as many people now use satellite navigation. Ask also long it will take them to reach the clinic.

Whilst they are on their way, make the most of those precious 10 minutes. If it's dark outside, don't forget to turn on the light in the car park and get everything ready. Try to gear the equipment to do likely emergency: seizures, caesarian, gastric torsion, unknown ...

Check the emergency trolley, even if it should always be ready. Prepare the operating theatre, get the surgical kits out but don't open them. Make sure the kennel, the cattery are clean and ready to hospitalise the patient. Ideally there should be a separate award for cats and dogs. If you suspect an infectious disease (cat flu, parvo ...) the pet will have to be put in quarantine. Unfold the stretcher. Don't forget the muzzle, the blankets. Switch on the machines that need to warm up: the PC for patient's notes, the x-ray machine, the x-ray processor, the ultrasound scanner, the blood analysers (calibrate it, if necessary), and ... the coffee machine! Warm up fluids, get the patient file out or prepare a new one, dish out the number of the toxicology centre (if poisoning is on your differential list) and revise your textbook.

When the patient arrives.

Remain calm!

Too often, the owner will arrive in an absolute panic. They are likely to focus on the main obvious lesion (for example, a broken limb), but might not be aware of the pallor of the mucosae signing an internal bleeding. If possible, someone should be named in charge of directing, taking notes of the procedures (potential litigation should always be kept in mind) and get useful information.

In most practices, the patient will be seen first in a consultation room. Make sure you have the following items :

- Clock on the wall
- Examination table + extra one or trolley
- Good lighting

Wash-basin with soap and paper towel (lots)

X-ray screen

Gas anaesthetic machine / O2

In addition, a box of tissues (if the owner is crying) and the small electronic scale (for weighing exactly infusion bags, amount of poisonous substances absorbed...) are also very useful and this emphasises the caring side of the practice.

For a detailed list of emergency drugs and materials indispensable for emergencies, please refer to the following: "Selected topics in emergency medicine ..."

Cats

Extra care should be taken for cats. They are likely to be highly stressed in an emergency unit environment. Remember that they are extremely sensitive to Sounds, Sights and Smells! So turn down the alarms of all the machines, avoid rushing, make sure that there is no dog or other cat in sight, keep the day/night pattern, avoid strong smells (ether, antiseptics, other pets' ...), remembered the behavioural welfare of the species (need to hide, climb, observe, rub ...), and when possible use the soothing effect of pheromones (Feliway?, cotton wool on chin).

Poly traumatised pets

Always consider the worst. Remember that cats are not small dogs. Be thorough and start with the ABC rule.

A = Airways,

B = Breathing, Bleeding

C = Circulation and Central nervous system.

Supply oxygen, fluids, control hypothermia, and most important pain. When the patient is stable perform a thorough clinical examination, taking one system at a time.

Hospitalisation = Malnutrition

- Malnutrition is the lack of proper nutrition, caused by not having enough to eat, not eating enough of the right things or being unable to use the food that one eats (The New Oxford Dictionary of English).

When a dog or a cat has to stay in the clinic for any length of time, it's likely to develop some stage of malnutrition. Even a short stay for a routine procedure (such as neutering) will have nutritional repercussions.



When forced to fast, the reaction of a healthy patient won't have major consequence. The lack of food leads to a physiological response: hunger. The aim is to preserve endogenous proteins and things return to normal once food is available. In the absence of food, the glycogen is broken down to maintain blood glucose levels (there is about 24 h supply). After 24 h fasting, the glucose will be produced from other components such as lactate, glycerol and some amino-acids (neoglycogenesis).

The situation is somehow different in the case of a critically ill or even simply kennelled patient. Lack of calorie is not life threatening whilst the depletion in amino acid will have major consequences. The trauma whether due to an accident or a surgical procedure, the disease, the infection and also the stress of being hospitalised will lead to a different response. Subsequently one cannot take the healthy animal as a model of fasting for a critical dog or cat. The release of mediators (glucocorticoids, catecholamines, cytokines, hormones) will cause a depletion in the amino acids.

Amino acids are the building blocks of proteins and proteins are indispensable for life and defence mechanisms through the production of immunoglobulins, clotting factors, acute phase reactants...

The following table shows the differences between a healthy fasting and a stress fasting :

	Starvation	Stress +++
Mediators	↑	↑ ↑ ↑
Protein synthesis	↓	↓ ↓
Catabolism	↓	↑ ↑ ↑
Gluconeogenesis	↑	↑ ↑ ↑
Energy expenditure	↓	↑ ↑
Malnutrition level	↑	↑ ↑ ↑

It was usually said that patients had to be fasted for 24 h prior to any anaesthesia but obviously fasting for 24h means that the animal will reach the operating theatre having already depleted his glycogen stock. This is of course also valid for water which should not be withheld too long to prevent dehydration.

Hospitalised pets are malnourished, even when they are cared for in a veterinary hospital where a nutritional unit has calculated the requirements (Remillard et al, 2001 ? Michel, 2006). Further more, in an emergency situation, nutrition is often overlooked. The medical or surgical emergencies are regarded as the most important factors to consider. In addition, feeding the

hospitalised patient is time and staff consuming.

Feeding hospitalised pets must be a priority, no more excuse such as :

Nutrition is not important, the broken leg needs fixing first.

The dog/cat is overweight anyway.

It will start eating when it will be hungry (in a couple of days).

It's on a drip.

I don't have time to finger/tube feed it, let's use parenteral feeding...

Consequences of malnutrition :

If a patient admitted for any kind of procedure (or trauma or disease) is malnourished, the following can be expected: impaired immune function leading to infectious complications, delayed healing (tissues are made of proteins), weakness, depression, altered drug metabolism, bad tolerance to treatment such as chemotherapy, radiation but also any anaesthesia where the risk of complications will be higher... As a result: malnourishment will increase the morbidity and the mortality.

It makes sense to use nutritional support as soon as possible in order to improve the organ and immune function, increase the tolerance to anaesthesia, treatments and procedures, reduce the incidence of infections, speed up wound healing and ultimately shorten the hospitalisation.

Assessment of malnutrition and measure of nutritional needs :

Anorexia lasting 3 days or more is a major indication for nutritional support. In fact, it is often difficult to find out how long the dog or the cat has been fasting. The history provided by the owner is not always accurate, digestive signs such as vomiting or diarrhoea will impair the absorption of the nutrients.

The resting energy requirement (RER = energy needed for basic life processes, in kcal) can be calculated using the following formula :

$$\text{Dog} = 70 \times \text{BW}^{0.73}$$

$$\text{Cat} = 40 \times \text{BW}$$

The protein requirement can also be estimated :

$$\text{Dog} : 20-30 \%$$

$$\text{Cat} : > 30 \%$$

In practice, one can use a ready made, balanced formula such as Recovery™.

Daily water intake :

50 to 100 ml/kg/day or in ml the daily requirements of kcal. External factors such as temperature, humidity or exercise must be taken into account.

Parenteral vs enteral nutrition:

The use of parenteral nutrition is becoming more and more frequent in veterinary intensive care. It requires a central venous access (peripheral one is of limited use) which implies strict asepsis and nursing. It's expensive and can induce hyperglycaemia (which is well known to promote infections). The parenteral nutrition can be stopped when 50 % of the nutritional requirements are covered by enteral feeding. This technique must be used in last resource since the guts are not made to remain empty! Bacterial translocation is a well recognised complication for any critical care "nil per mouth" patient. The enteral nutritional support reduces septic morbidity, preserves the enterocytes and promotes the intestinal barrier function and the production of IgA (local immunity). The intestinal motility requires some kind of bulk to work on which means that liquid enteral feeding is not sufficient.

In fact there are very few situations where enteral nutrition is contra indicated. The patient must be cardio-vascularly stable since it is paramount to have a good blood supply of the digestive tract. It is also important to have restored the fluid and electrolytes balance, especially if the animal has been drinking too much or too little.

Some conditions will increase the risk of aspiration pneumonia such as

- Coma, in case of unconsciousness or lateral recumbency, the patient should be put in sternal recumbency and head and trunk tilted at 30°.

- Persistent vomiting : promoting gastric emptying is recommended
 - o Metoclopramide: 0.5 – 1 mg/kg/day
 - o Cisapride: 0.2 mg/kg/day

- Acute pancreatitis and gastric mucosal diseases: feeding through a jejunostomy tube is advocated by some specialists. Alternatively medical additional treatment can be useful.
 - o Sucralfate can be used to treat oesophageal, gastric and duodenal ulceration at the dose of 500 mg/dog < 20kg PO, every 6 to 8 hours. Bigger dogs will receive 1 to 2g per animal.



This should be administered preferably 1 hour before the meal.

Enteral feeding : putting things in practice.

You should start early but go slowly. The usual re-feeding pattern is as follow: 1/3 the first day, 2/3 the second day and 3/3 from the third day. Sometimes a combination of parenteral and enteral feeding is needed but the ultimate goal is for the pet to eat on its own.

Syringe feeding can be useful with small pets, to initiate the appetite but the method should not be prolonged for any length of time because it's really difficult to cover the nutritional needs through syringe feeding and it is also time and staff consuming. Offering warm, fresh and highly palatable food, coaxing and finger feeding are helpful and obviously lots of common sense and TLC are compulsory.

Appetite stimulants must only be used as a kick start but they are ineffective on the long term. Side effects must not be overlooked. It is generally sedation and aggressiveness (mind your fingers after injecting diazepam to a cat!) but cases of idiosyncratic liver failure have been reported. (Dose for diazepam : 0.05 to 0.15 mg/kg IV or IM). Corticosteroids and megestrol acetate should not be used for stimulating the appetite.

Indications for assisted feeding: numerous!

Poor condition to start with

Cachexia: cancer, heart failure

Nil per mouth for 3-5 days

Hepatic lipidosis (cat)

Cat flu (calicivirus and ulcers)

Metabolic diseases: diabetes

Risk of complications (sepsis, aspiration pneumonia, peritonitis)

Protein loss: burns, protein losing enteropathies, kidney diseases

Trauma (RTA, surgery, metabolic, neoplastic or infectious diseases)

But also...

Dental

Shock

Parvo : nowadays early feeding is recommended in case of parvo-gastroenteritis. The prognosis remain guarded but the dogs receiving early feeding have a better survival rate (Mohr et al 2003).



Methods :

The placement of the different feeding tubes will be the topic of another lecture but here is a summary.

Type of tube	Duration	+	-
Nasoesophageal	Short (< 5 days)	Inexpensive, easy to place (no GA)	Liquid or finely grinded diet, not always well tolerated
Oesophagostomy	Long term	Mildly expensive (GA), easy to place, dense diet, home feeding, well tolerated	Not to be removed early (leak), cellulitis
Gastrostomy	Long term	Easy to place (percutaneous), calorifically dense diet, well tolerated, home feeding	Surgical procedure, endoscope, GA, peritonitis
Jejunostomy	Long term	By-pass stomach and pancreas	Laparotomy (GA), hospital only (continuous infusion), liquid diet, risk of peritonitis

Whether you are using a nasoesophageal, an oesophagostomy, a pharyngostomy, a gastrostomy or an enterotomy tube, the following basic rules apply.

Stay clean!

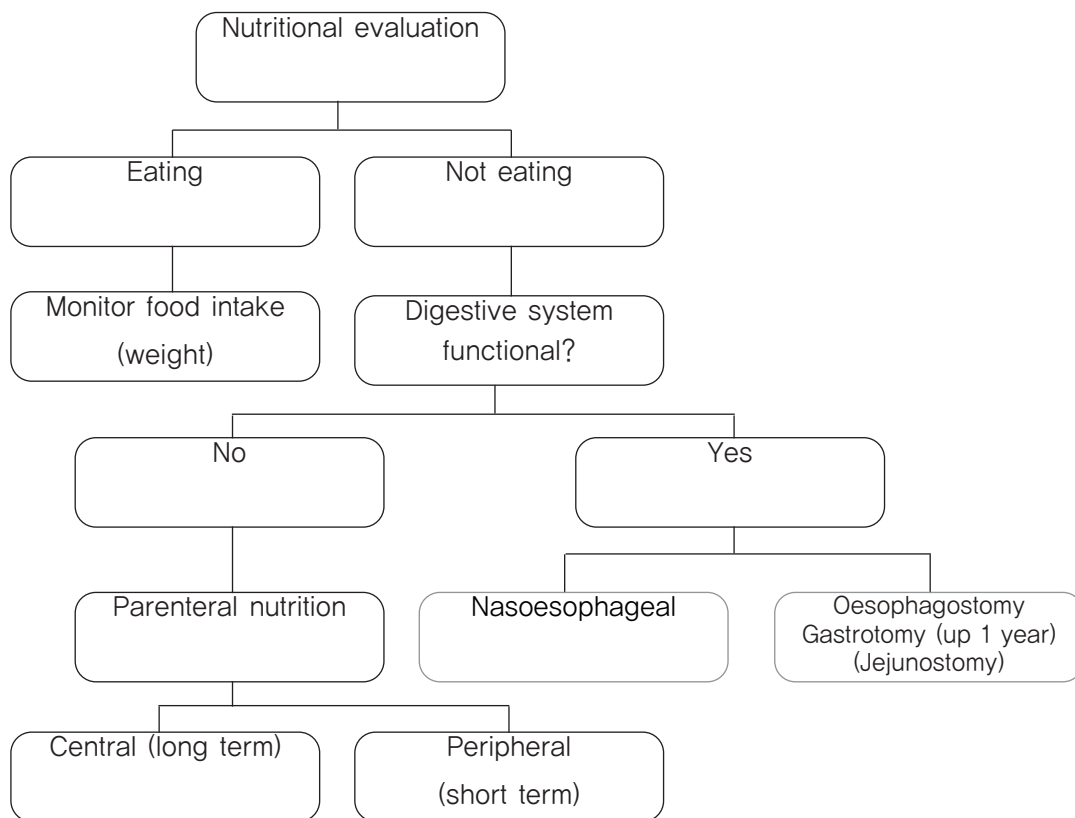
Always flush the tube to prevent clogging: saline, spring water, Coke, pineapple juice, pancreatic enzymes.

The main risk is over-feeding so make sure you measure the amount given. For staff training purposes it is advisable to keep barium x-rays to assess the gastric volume of different pets.

Summary :

Nutritional support is extremely important for any hospitalised patient. It should not be overlooked.

The following decision tree can be used for any critical care patient :



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